Electronic Fingerprint Spectroscopy

Fact Sheet

Project Information

ELFIS

Grant agreement ID: 947288

Project website

DOI
10.3030/947288

EC signature date
13 October 2020

Start date
1 May 2021

End date
30 April 2026

Funded under
EXCELLENT SCIENCE - European Research Council (ERC)

Total cost
€ 2 227 875,00

EU contribution
€ 2 227 875,00

Coordinated by
TECHNISCHE UNIVERSITAET GRAZ
Austria

Objective

Solar ultraviolet (UV) radiation is strongly absorbed in our atmosphere and triggers a variety of photo chemical reactions, strongly influencing the earths development. Exact knowledge of the photo chemistry of environmental trace gasses is of paramount importance to understand effects contributing to global warming and to develop strategies for its abatement. Yet, despite the enormous relevance, spectroscopic information in the UV spectral region is scarce mainly owing to the lack of intense UV laser sources.
ELFIS will surpass this limitation by transposing ultra-broadband dual frequency comb Fourier transform spectroscopy into the UV via harmonic frequency up-conversion. Linking competencies originating at the forefront of frequency comb metrology and ultrafast science will permit absorption spectroscopy in the UV

spectral region with an unprecedented micro-eV resolution, unparalleled signal-to-noise ratio and record-short acquisition times. Congested absorption features of complex gas mixtures of fundamental, environmental and astrophysical importance will be recorded with a resolution at least one order of magnitude beyond state of the art.
The worlds first UV dual comb spectrometer will demonstrate its potential by exploring the Rydberg state series close to 10 eV in the air pollutant methyl iodide. Also, the new technique will permit the first complete rotationally resolved study of the Rydberg bands in the most prominent greenhouse gas carbon dioxide around 11.3 eV.
Time-resolved investigations with a unique combination of ultra-high spectral and high temporal resolution will explore photo-induced dynamics in atoms and molecules involving transient effects such as level splittings, shifts and quantum beatings at a new level of detail. With ELFIS, ultrafast dynamics linked to the UV photo-induced population transfer and dissociation in methyl iodide will be tracked with an unrivalled energy state resolution (3 orders of magnitude beyond state of the art).

Fields of science (EuroSciVoc)

natural sciences > physical sciences > optics > **laser physics**

natural sciences > physical sciences > optics > **spectroscopy**

Keywords

Laser spectroscopy | frequency combs | pump-probe spectroscopy | high harmonic generation | dual comb | spectroscopy

Programme(s)

H2020-EU.1.1. - EXCELLENT SCIENCE - European Research Council (ERC) MAIN PROGRAMME

Topic(s)

ERC-2020-STG - ERC STARTING GRANTS

Call for proposal

ERC-2020-STG

See other projects for this call

Funding Scheme

ERC-STG - Starting Grant

Host institution

TECHNISCHE UNIVERSITAET GRAZ

Net EU contribution

€ 2 227 875,00

Total cost

€ 2 227 875,00

Address

RECHBAUERSTRASSE 12
8010 Graz
Austria

Region

Südösterreich > Steiermark > Graz

Activity type

Higher or Secondary Education Establishments

Links

Contact the organisation Website
Participation in EU R&I programmes
HORIZON collaboration network

Beneficiaries (1)

TECHNISCHE UNIVERSITAET GRAZ

Austria

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